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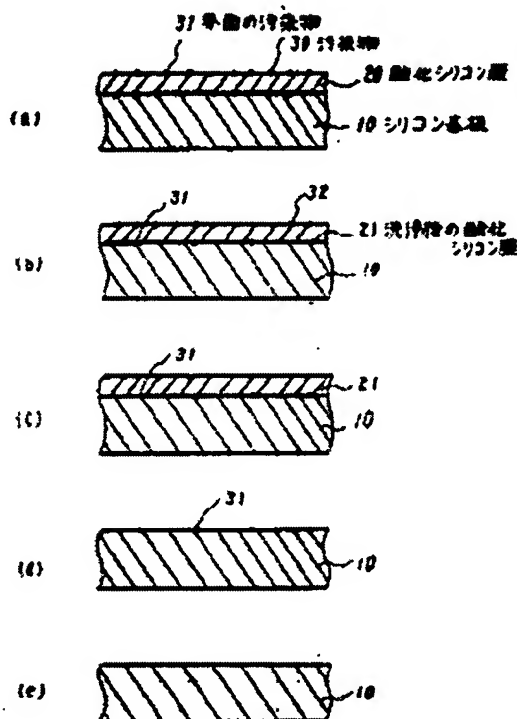
(54) SURFACE CLEANING  
METHOD

(57) Abstract:

PURPOSE: To obtain the epitaxial film of excellent crystallizability by a method wherein, when an Si epitaxial film is going to be grown on an Si substrate, an etching is performed by projecting an XeF<sub>2</sub> molecular beam on the surface of the substrate, and the contamination on the substrate is effectively removed.

CONSTITUTION: The natural oxide film 20 of ten and several  $\mu$ m in thickness is present on the surface of an Si substrate 10, and also the contaminated impurities 31 such as carbon and the like are present on the interface of the surface of the substrate 10 and the film 20. As excellent crystallizability can not be obtained even when an epitaxial film is grown on the surface of the substrate 10 under the above-mentioned condition, the following procedures are performed. Ammonia water of 28%, hydrogen peroxide water of 30% and water are mixed at the ratio of 1:4:20, they are boiled up, the substrate 10 is dipped in the mixed solution, the film 20 is removed, and the SiO<sub>2</sub> film 21 of good quality is newly generated. However, as a part of the impurities 31 still remain on the interface, the impurities 31 are removed by heating up to 600W850°C in a vacuum chamber for a short period of time, and the film 21 is also removed. Subsequently, an XeF<sub>2</sub> molecular beam is projected from a nozzle, and carbon and the like is removed with the generated SiF<sub>4</sub>.

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